DOCUMENT RESUME

ED 094 520 EC 062 465

AUTHOR Bruce, Robert V.
TITLE Alexander Graham Bell: Teacher of the Deaf.
INSTITUTION Clarke School for the Deaf, Northampton, Mass.
PUB DATE 3 Mar 74
NOTE 14p.

EDRS PRICE MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS Aurally Handicapped; *Biographies; *Deaf; *Exceptional Child Education
IDENTIFIERS *Bell (Alexander Graham)

ABSTRACT

The lecture on Alexander Graham Bell by Dr. Robert V. Bruce, the author of a biography of Bell, focuses on Bell's association with the Clarke School for the Deaf in Massachusetts. Noted are Bell's employment by the school at 25 years of age and the preceding period during which Bell taught elocution at a boys' school in Scotland and used his father's system of Visible Speech at a London school for the deaf. Also described are his early commitment to lipreading and the oral approach to deaf education, his development of the telephone as a byproduct of his inventions to aid deaf students, his lifelong involvement in problems of the deaf, his marriage to a deaf woman, his financial support of schools for the deaf, his support of partial integration of deaf students with hearing students, his controversies with Edward Gallaudet, his investigations into the heritability of deafness, his role in directing Helen Keller's father to the Perkins Institution, his correspondence with Helen Keller, his interest in heavier-than-air flight, his service on the Board of Governors of the Clarke School, and his death in 1922. (DB)

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ALEXANDER GRAHAM BELL

Teacher of the Deaf

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EC062465

Published by The Clarke School for the Deaf
Northampton, Massachusetts 01060
March 3, 1974

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"Of one thing I become more sure every day—that my interest in the deaf is to be a lifelong thing with me . . . I shall never leave this work . . ."

These words written by 29 year-old Alexander Graham Bell to his deaf wife, Mabel, after the invention of the telephone, were among those quoted by Dr. Robert V. Bruce in the first of a planned series of annual lectures to be held at Clarke School in commemoriation of one of the most versatile geniuses in the history of mankind.

Dr. Bruce, a Professor of History at Boston University and author of "BELL: Alexander Graham Bell and the Conquest of Solitude" (Little, Brown & Co. 1973) was recommended to the school administration as the most knowledgeable person in the world on the subject of Dr. Bell, by Bell descendants, Mrs. Lilian Grosvenor Jones, Vice Chairman of the Clarke School Board of Trustees and Dr. Melville Bell Grosvenor, Board Chairman of the National Geographic Society. It was the National Geographic Society which afforded Dr. Bruce access to all of Dr. Bell's papers, enabling him to write the first definitive biography on the great American.

Dr. Bruce chose as the title of his lecture, "Alexander Graham Bell—Teacher of the Deaf," and developed sequentially Bell's lifetime commitment, his devotion, and his efforts and accomplishments in breaking down the invisible barrier of silence, which had, until then, separated the deaf from all the rest of mankind.

Although an engineer through undergraduate study and experience with the army, Dr. Bruce turned to history, a subject which had long held his interest, for his graduate work. His first book, "Lincoln and the Tools of War" grew out of his doctoral dissertation at Boston University. Dr. Bruce taught at the University of Bridgeport and at Lawrence Academy, before returning to Boston University in 1955. His second book, "1877: Year of Violence," was published in 1959.

Alexander Graham Bell:

Teacher of the Deaf

Early in March 1872 a young man, just turned twenty-five, began an association with the Clarke School that would last through the remaining half-century of his life. The series of annual lectures that this inaugurates is evidence that in spirit the association of the man with the school lives on even into its second century. For the young man was Alexander Graham Bell.

When he first came to the Clarke School he was a tall, slender, black-haired, dark-eyed Scotsman of extraordinary charm, among whose attractive features was a pure, resonant voice. That voice was lost on the deaf children he had come to help. What won them was their young teacher's expressive face, his kindliness, and his enthusiasm. He threw himself eagerly yet patiently into the work of teaching them to speak well. Only when winter loosened its grip on the Connecticut River valley and the chestnut grove on Round Hill began to turn green did he permit himself to relax with an occasional solitary ramble in the countryside. On those afternoon walks he diverted himself with amateur geology. But his mind must have turned back now and then to the events and impulses that had brought him from his Edinburgh birthplace to Northampton and to the proud calling of "teacher of the deaf."

The interplay of sound and silence, of speech and deafness, ran through his earliest childhood recollection, one of pushing into a wheat field to see if he could hear the grain grow, of getting lost in it, of hearing his father's voice calling him, of running toward it and being caught up in the arms of his deaf mother. His mother's deafness was not total. She was a good pianist and could monitor her own playing by resting the end of her hearing tube on the sounding board. Aleck, even more effectively than his two brothers, could communicate with her in a low voice close to her forehead. Nevertheless her hearing was seriously impaired; and the fact must have been emphasized, even for a small boy, by the irony of his father's profession, the teaching of speech.

It was an irony that the boy would eventually duplicate even more strikingly in his own marriage. Yet the seeming paradox had a certain fitness, for the father was more than a teacher. He was also an investigator, indeed a scientist, in the field of phonetics. Though the boy's grandfather had once been a prompter for a play about the Abbe de l'Epee, a pioneer teacher of the deaf, and though Thomas Braidwood had been famous years before for teaching speech to the deaf in Edinburgh, the father did not turn his gifts and knowledge in that direction. Instead, the elder Bell devoted himself to classifying all the vocal sounds known or conceivable and therefore, necessarily, to devising a simple yet precise and complete system of phonetic notation. Symbols indicating the positions of the several organs of speech were to be combined so as to show the reader how to produce any given vocal sound even if he had never heard it before. When after many years of experiment and thought the elder Bell perfected his system, he christened it "Visible Speech." And in coining that name, he came round to his wife's problem. Perhaps it was that problem that had

subconsciously prompted the name. One London newspaper saw the connection when it commented. "We cannot pretend even to guess at the horizons opened up by such an alphabet in the training of the deaf, the dumb, and the blind."

Several influences combined to set the younger Bell in pursuit of those horizons. The example of his brilliant father must have made the idea of teaching both a challenge and an inspiration to the boy. So did the formative year during his middle teens when he lived with his widowed grandfather in London. The grandfather, also a noted teacher of speech, once wrote: "Perhaps, in no higher respect has man been created in the image of his Maker, than in his adaptation for speech and the communication of his ideas." The grandfather impressed that ideal on the boy's mind and trained him in the skills and knowledge needed to act upon it. That year and that influence, wrote Bell in retrospect, "converted me from a boy somewhat prematurely into a man."

Bell's first job was as a teacher, though not a teacher of the deaf. At a boys' school in northern Scotland, he found deep satisfaction in teaching elocution. Meanwhile his adolescent rivalry with his father led him into experiments on the acoustics of the vocal organs, experiments carried on with the help of tuning forks and thereby pointing the young teacher toward the mechanical and electrical reproducation of vocal sounds. Not until 1868, five years after he began his teaching career, did a call come to the kind of teaching that would be his lifelong concern.

Bell's father had at first seen the use of Visible Speech in teaching the deaf as an incidental possibility. By 1868 he came to regard that as one of the chief potential uses of his system, and he said as much in his public statements. One of his former students, Susanna E. Hull, who ran a private school for deaf children in London, took him up on the claim and asked for help in testing it. The younger Bell thus began his teaching of the deaf at Miss Hull's school on May 21, 1868.

Here we must consider certain fundamental traits of Bell's mind and temperament, traits alluded to in the subtitle of my biography of Bell: "Alexander Graham Bell and the Conquest of Solitude." The phrase "conquest of solitude" applies, to be sure, to Bell's teaching of speech to the deaf and to his most famous triumph, the invention of the telephone. But it also applies to his own nature. Though he had an older and a younger brother in a close-knit family, something made him a rather solitary boy, given to solemn Sabbath meditations and to long, lone musings on a hilltop near Edinburgh. Perhaps the tendency was inborn, perhaps it had something to do with his mother's deafness and his father's rather overpowering eminence and sharpness of humor. We can only speculate. But there it was, and the crucial year in the sole company of his grandfather intensified it. He developed the habit, which was also his father's, of working alone long into the night and sleeping late the next day. He seemed older than his years and correspondingly distant from his contemporaries. Throughout his life, he found it difficult to talk without reserve—except on such impersonal matters as science or technology—to anyone outside his family, and this inability distressed him.

We might surmise that such feelings helped to give him his deep personal empathy with the non-speaking deaf—the "deaf-mutes" or "deaf and dumb," as they were called in his youth. But an address he made in 1887 goes far to relieve us from the need to surmise. In describing the situation of the deaf in the past, he said: "Who can picture the isolation of their lives? When we go out into the country and walk in the fields far from the city we think we are solitary; but what is that to the solitude of an intellectual being in the midst of a crowd of happy beings with whom he can not communicate and who can not communicate with him. I know that the most lonely place on the face of the earth is the heart of the city of London. I have stood on the sidewalk and seen hundreds and thousands of

people pass by me, and not known a soul, and the sense of loneliness in the midst of so many is oppressive. How then must have been the loneliness of the deaf child in (past) ages . . .?" This revealing aside, taken with his closeness to his deaf mother, dispels any sense of paradox in the fact that a man of unusually keen hearing and impeccable speech should so closely identify himself with the deaf. In it is the deepest meaning of my phrase, "the conquest of solitude." For in helping others to conquer their solitude, Alexander Graham Bell would conquer his own.

At Miss Hull's school he found his father's Visible Speech notation useful in teaching four little girls, aged from six to eight, how to pronounce many words. Perhaps the most poignant and most satisfying triumph is revealed in Miss Hull's letter to the young teacher reporting that one of the girls had been going about the house happily repeating the words, "I love you, Mama." But that fall Bell's father made a speaking tour in the United States, and the son had to carry on his father's speech classes. After the father returned, Aleck continued as his assistant. Aleck's parents soon decided to settle in Canada, where some old friends had gone to live. Aleck's younger brother had died of tuberculosis; and when his older brother died of the same disease in 1870, Aleck was persuaded to come along to the New World for the sake of his health.

On the American speaking tour in 1868, Bell's father had made public mention of his son's successes with deaf children. One such reference in a Boston appearance was remembered by Miss Sarah Fuller, who in 1869 took charge of a new public day school for deaf children, the Boston School for Deaf Mutes (eventually renamed the Horace Mann School). After settling his family in Brantford, Ontario, Bell's father gave a series of lectures in Boston, where Miss Fuller asked his help just as Miss Hull had done in London. As in the earlier case, Bell's father enlisted him in the cause. And as before, the younger Bell triumphed with the help of the Visible Speech system and his own talent and enthusiasm. This time, his triumph got into the newspapers, and his reputation began to spread through what one journal called the "silent world" of the deaf. This publicity was what brought him the invitation to demonstrate his methods at the Clarke School in March and April 1872.

His success at the Clarke School in teaching speech to the pupils and in training their teachers to apply his methods won him still wider recognition. The Japanese commissioner of education turned up with two Amherst professors to look into Visible Speech and its applications to general education as well as that of the deaf. But Bell was shifting his emphasis away from promoting Visible Speech in all its applications and was making the teaching of the deaf his prime goal. He had already challenged the doubts of his father, that internationally known authority on the physiology of speech, as to the possibilities of lipreading. To his father's objection that certain key elements of speech were produced by vocal actions not externally visible, Bell replied that the context helped bridge those gaps. This view must have commended him to the president of the Clarke School, Gardiner Greene Hubbard, when Hubbard arrived from a European tour of articulation schools in April 1872.

The name and the work of Gardiner Hubbard is, I am sure, familiar to all who know the Clarke School. But Hubbard was to become so central to the Bell story that a brief recapitulation is in order. When he met Bell for the first time, Hubbard was a fifty-year-old Cambridge lawyer of distinguished Massachusetts ancestry. He was also a promoter of enterprises and causes—a street railway, a water supply system, a gas light company, a plan for a quasi-public telegraph system. Mabel, one of his four daughters, gave him another and a nobler cause. In 1863, when she was five, scarlet fever left her totally and permanently deaf. Teachers of the deaf at that time discouraged Hubbard's hope that his daughter might

retain and improve her speech. Despite Thomas Braidwood's success, the American pioneer in education of the deaf, Thomas Gallaudet of Hartford, had rejected the teaching of speech and lipreading in favor of the Abbe de l' Epee's sign language; and Gallaudet and his son, Edward, had made sign language dominant among the deaf in the United States. But Hubbard and his wife heard of the oral method's effectiveness in Germany. They preserved their daughter's ability to speak, developed her ability to read lips, and educated her in English. With Mabel's success as a prime argument, Hubbard played a major role in getting a state charter in 1867 for the school endowed at Northampton by John Clarke, where the oral method would be used exclusively.

Having planted the seed of his method at the Clarke School, Bell moved on to other triumphs without meeting Mabel Hubbard. He even went by invitation to the Hartford school founded by Gallaudet and spent two successful months teaching speech there. At the graduating exercises he addressed the pupils in sign language. But that expedient did not mean conversion. On the contrary, when a boy died at the school, Bell wrote home: "Nothing can show better how the too great use of signs tends to isolate deaf-mutes and constitute a class apart from hearing people than this boy's case. When he was dying, he did not want to go home. His friends, he said, could not understand him and he was happier in the Asylum." Bell may have remembered how the little girl in Miss Hull's school had looked forward to going home when she knew she could say, "I love you, Mama."

So that fall Bell opened his own private school in Boston. Of the dozen pupils who came to him, the most important in shaping his career turned out to be five-year-old George Sanders, son of Thomas Sanders, a Haverhill leather merchant. It was the environment of Boston, center of American financial and industrial enterprise, that reawkened Bell's interest in the electrical generation of sounds and the application of that principle to telegraphy, and thereby led him to his most famous achievement, the invention of the telephone. Though the telephone story is too complex to tell here, it is closely intertwined with the story of his work with and for the deaf. Thomas Sanders and Gardiner Hubbard, for example, became his original backers and partners in the telephone enterprise. And when Bell became professor of vocal physiology at Boston University in 1873, the university's connections with the Massachusetts Institute of Technology gave Bell access to M.I.T.'s physics laboratory with its electrical and acoustical apparatus.

In that fall of 1873, Mabel Hubbard came to him as one of his private pupils. She found him, as she later recalled, "so quick, so enthusiastic, so compelling, I had whether I would or no to follow all he said and tax my brains to respond as he desired." If he had needed any confirmation of his faith in the practicability of lipreading, she would have provided it. Before long, he and Mabel found more than intellectual inspiration in each other. They fell in love. And in 1877, after a hectic courtship and a two-year engagement, they were married.

The four years before his marriage were crowded years for Bell, bringing him to the early climax of his career as inventor. In 1874, hoping to give his deaf pupils a way of checking on the sounds they made, he experimented with the phonautograph, a device for the graphic recording of sound vibrations. This fused with his work in electrically sounded tuning forks and the so-called harmonic multiple telegraph to produce his conception of the telephone. In 1875 he tested the general principle and found that it worked. In 1876 he patented the telephone, transmitted intelligible speech with it, and revealed it to the world, most notably through his exhibit at the Centennial Exposition in Philadelphia. In 1877 he promoted it in a series of public lectures, got married, and set out on a honeymoon trip to England that lasted more than a year.

In spite of all this, Bell kept up his private classes till the end of 1875 and his university classes until the spring of 1877. And in November 1876, by which time it had become evident that the telephone was about to make him financially independent, he wrote Mabel: "Of one thing I become more sure every day—that my interest in the Deaf is to be a life-long thing with me. I see so much to be done—and so few to do it—so few *qualified* to do it. I shall never leave this work—and you must settle down to the conviction that whatever successes I may meet with in life—pecuniarily or otherwise—your husband will always be known as a 'teacher of deaf-mutes'—or interested in them."

Even the distractions of celebrity, business, telephone promotion, and fatherhood could not prevent him during his months in England and Scotland from visiting institutions for the deaf, explaining his own views to them, and learning from their experiences. He experimented there also with the use of the telephone and the newly invented microphone in combination as a hearing aid, though recognizing that neither his technical expertise nor that of anyone else for years to come would be equal to that delicate and complex problem. He leaped at an opportunity to launch a public day school for the deaf in Greenock, Scotland. "I have been so happy in my little school," he wrote presently, "happier than at any time since the telephone took my mind away from this work." He seemed rather disappointed when the permanent teacher he had recruited at last arrived to take over the work. "Do you know, dear," he wrote Mabel, "I think I can be of far more use as a teacher of the deaf than I can ever be as an electrician."

But he could escape neither the claims of the great industry he had called into being nor the lure of science and invention. For years after the Bells returned to the United States in 1878, the fame and fortune that came out of the telephone invention inspired scores of rival claimants, some sincere in their belief, some mentally unbalanced, some deliberate liars, but all of them unjustified, as the courts invariably ruled. If only to vindicate his honor, Bell had no choice but to join the battle being waged in his behalf. He had planned to start his own school in 1879, but the demands of invention and court testimony delayed him until 1883. Then he opened a little private day school in Washington, D.C. He wanted it to be a paradise for children, and by the standards of that day it was. The little class of six children met in a room with a soft rug and a low table around which they could cluster. Pictures and ornaments, games, toys, and books, and a big window looking out on a lawn and garden, all appealed to their senses of sight and touch. He developed what he called "a museum full of common things," each labeled with its name in Visible Speech and conventional writing. Gradually the labels were discarded in favor of spoken names. The results were encouraging. But in 1885 a new and formidable assault on his claim to the telephone challenged his honor, and he had to give up the little school. This he remembered as one of the great disappointments of his life.

So at last he resigned himself to helping the deaf in ways less direct but more widely and permanently significant. One of these ways was financial. Most people had and still have an exaggerated idea of the wealth Bell realized from his telephone invention. They thought in terms of Rockefeller's billion dollars or Carnegie's half-billion or at least the fortunes of many millions each that had been amassed by a number of their contemporaries. Bell's fortune seems never to have got much above one million. One reason for that was the total of $450,000 he gave for the welfare of the deaf over the years. Some of it went in small sums to distressed individuals. Most of it went to schools such as the Clarke School and the Horace Mann School, and especially to Bell's own organization, the American Association for the Promotion of the Teaching

of Speech to the Deaf, and to its headquarters and library, the Volta Bureau.

More than that, he gave long and active leadership and the weight of his eminence to the cause as he saw it. That cause can be reduced to one fundamental and unchanging goal: to conquer the solitude of deafness in any way possible.

Physical mingling of the deaf with the hearing was one way, and so Bell favored the establishment of public day schools. In these, the deaf pupils would play, though not necessarily study, with hearing pupils. Moreover, the deaf pupils would have the daily stimulus of life with their families and to some extent with the hearing world. There was also the practical argument which had proved effective in Scotland, that day schools would cost less per pupil. Most important of all was the help that day schools could give to many children who were too deaf for regular public schools and unable, for lack of space or other reasons, to attend boarding schools, and who were therefore growing up in ignorance.

By inventing the audiometer in 1879, Bell made a major contribution to the detection both of unsuspected hearing impairment and of unsuspected residual hearing. This advanced the day school cause by revealing which children needed and could use such help. But Bell's most direct contribution to the cause was his work as a lobbyist for state support. At the state capital of Wisconsin in 1885, he spent two weeks testifying before committees, helping to draft reports, writing a persuasive open letter to the legislature, and converting politicians through informal conversations. The state system that resulted became a model for other states. Bell kept in close touch with the spread of the "Wisconsin system" of state-subsidized day classes, gave advice and encouragement, wrote letters, and often made special trips to testify before various state legislatures. At sixty-seven he was ready to go to Minnesota against his doctor's orders if his personal presence were needed; fortunately, it was not. He also organized the parents of deaf children in behalf of the movement, and they did good service, especially in winning the day in Chicago with Bell's shrewd coaching. In 1918, the city of Chicago built a fine new day school in which, as Bell had long recommended, deaf and hearing children could study in separate classes but mingle at play. It was named the Alexander Graham Bell School, an honor which, according to one of his closest friends, Bell prized more than any other he had received to that time.

Bell saw day schools as aiding, not replacing boarding schools. He kept in frequent touch, both by correspondence and in person, with many boarding schools for the deaf. He visited their oral classes, gave advice when asked, recommended candidates for teaching vacancies, now and then helped out with a check. In 1898 he succeeded the late Gardiner Hubbard on the board of corporators of the Clarke School. In his lobbying, he never opposed the establishment of any school for the deaf, whether boarding or day, however its methods might differ from what he thought was best. Nevertheless, his goal always remained that of breaking down the barriers between the deaf and the rest of the world. The physical association encouraged by day schools, while helpful, was only part of the solution, and not the major part.

Livelihood, ideas, friendship, and love all depend on communication. For all the deaf, Bell wanted the limits of communication pushed to their utmost; and with Mabel as inspiration and evidence, he believed that for more of the deaf than was commonly supposed those limits were as wide as the world. Bell was literally a fighter for freedom of speech, though in a sense so elemental as seldom to be used. But he himself did not put it that way. Instead, his watchwords were articulation and speechreading.

His dedication to those principles meant years of struggle, not only against inertia and ignorance but also against active, formidable, and

perhaps equally dedicated opposition. On the issue of articulation, the disagreement was not on whether every deaf child should try learning to speak, but on how determined the trial should be. To read the speech of others was still more demanding. Bell recognized that not everyone had the aptitude and perseverance necessary for complete success. But he believed that example, encouragement, and practice might reveal aptitude and strengthen perseverance. Here again the disagreement was on the degree of persistence, but in this case the disagreement was far wider.

The issue was joined on the practical question of how, rather than what, the pupils were to be taught. Since writing, finger spelling, and sign language were all easier for the deaf to master and more reliable in use, Bell feared that they might tend to displace speech. And to use any of them in teaching, he believed, would tend that way. Writing and finger spelling kept up some proficiency in English, and so Bell was willing to use them in the early stages of teaching, at least with those born deaf, though he believed that speech should be taught from the beginning. But he opposed the use of sign language at any time. He conceded it to be aesthetically pleasing (though Mabel thought otherwise) and easiest for deaf children to acquire and use among themselves. But in that very ease he saw danger. Sign language was quite different from any spoken language, being ideographic rather than phonetic, limited in precision, flexibility, subtlety, and power of abstraction. Therefore, he insisted, so far as sign language became a medium of thought, it was a narrow prison intellectually as well as socially.

For many years Bell served as the recognized leader of those who opposed the use of sign language in teaching—or to put it more positively, of those who wanted deaf children encouraged to think and communicate in English. His chief adversary was Edward Gallaudet, president from 1857 to 1910 of what is now Gallaudet College in Washington, D.C.

In charm, eloquence, and enthusiasm, Gallaudet resembled Bell. Like Bell also, Gallaudet had a deaf mother and the challenge and example of a celebrated father. Converted to articulation and lipreading by Hubbard, Edward Gallaudet backed off eventually to a position more tolerant, even sympathetic, toward sign language than was Bell's. Though Gallaudet called his approach the "Combined Method," Bell regarded it, with some justice, as only a cover for sign language. Certainly Gallaudet saw the sign language as an "indispensable" part of his method.

Bell and Gallaudet admired each other's abilities and respected each other's devotion to helping the deaf. They did not conceal their differences in private or in public, but their sparring was genial enough for several years. In 1880 it was Gallaudet's college that gave Bell the first of his honorary degrees. Each evidently hoped to convert the other or at least persuade him to come most of the way to a meeting of minds. But by the late 1880s it was becoming more and more apparent that the gap had narrowed as much as it ever would.

In the early nineties the two men clashed head on over a series of issues, especially a proposed congressional appropriation for a teacher-training department at Gallaudet College. Despite Gallaudet's assurances to the contrary, Bell feared that deaf graduates of Gallaudet would eventually be admitted to that department. The deaf might teach the deaf many things, Bell felt, but not speech; and that was at the heart of his hopes for the deaf. At last Gallaudet attacked Bell bitterly at the 1895 meeting of the American Convention of Instructors of the Deaf; and since Bell was no longer an "instructor of the deaf" in the narrowest sense, Gallaudet succeeded in having Bell's membership in the organization revoked.

In 1900, Bell and Gallaudet reestablished their personal friendship, but the difference of opinion remained. Sixteen years before, Bell had warned Gallaudet that "these discussions and controversies may continue . . . to the end of time *without settlement* unless some new element can be introduced into the problem." New elements have been introduced, among them technological advances derived from Bell's own great invention, but the settlement is yet to come.

In the absence of such a settlement, the cause of the deaf may be benefitted in both camps by the spur of honest competition. If anything can be said for such a view, it would at least offer some consolation to the spirit of Edward Gallaudet. For in 1890 it was Gallaudet's own intransigence that spurred Bell to found a new organization, independent of the Gallaudet-dominated American Convention of Instructors of the Deaf, and to maintain it generously and vigorously for the rest of his life. It was christened, as I remarked earlier, the American Association for the Promotion of the Teaching of Speech to the Deaf. The name was precise but unwieldy and in 1956 was replaced by the equally fitting and more convenient title, the Alexander Graham Bell Association for the Deaf. Bell endowed his Association with $25,000 and gave it an equal amount in addition over the years. More than that, he gave it leadership, encouragement, ideas, and the prestige of his fame.

Despite Bell's personal commitment to the oral method of teaching and to day schools, he held the new Association to the strategy of neutrality on those questions so that it might focus on the goal announced in its original name: the teaching of speech to the deaf. It welcomed as members not only oral teachers of speech, but also sign teachers interested in teaching speech, and indeed all other advocates of that object, teachers or not. This policy warded off a renewal of hostilities with Gallaudet's organization once the Bell-Gallaudet break had been patched. It gave the Association a positive and constructive tone. When Bell organized it in 1890, only about forty per cent of all deaf pupils were being taught speech. By the time of his death some thirty years later, the proportion had risen to more than eighty per cent. Other individuals and institutions, including the Clarke School, contributed much to that advance. But Bell and his Association were conspicuous in the vanguard.

One of Bell's concerns in his lifelong striving for the welfare of the deaf, and one of his arguments for the oral method, was the possibility that intermarriage among the deaf might increase the number of deaf children. During the late nineteenth century, perhaps encouraged by the triumph of Darwinian biology, interest developed in the laws of inherited traits generally. In 1878, the Massachusetts State Board of Health enlisted Bell in an effort to gather statistics on inherited deafness. Data proved too hard to get in time for the Board's purposes, but Bell characteristically kept on anyway. By 1883 he was able to produce a paper for the National Academy of Sciences entitled, somewhat overdramatically, "Memoir upon the Formation of a Deaf Variety of the Human Race."

In his paper, Bell emphasized the incompleteness of his data and called for more research. Nevertheless his findings made certain disquieting conclusions inescapable. Deaf parents had a much higher proportion of deaf children than did the population at large. Also, the deaf strongly tended to marry the deaf. Thus the title of the paper. Bell opposed the idea of prohibiting marriage between the congenitally deaf. After all, he himself had braved opposition to his marriage by the Hubbards, who had thought him too old for Mabel; he knew how little love cared about locksmiths. Instead he advocated warning of the risks beforehand and above all broadening the opportunities for friendship and so for marriage between the deaf and the hearing.

Bell was wiser than some early students of human heredity. He recognized the complexity of deafness too well to attempt formulating precise laws of inheritance. Even today, a congenitally deaf couple cannot be told precisely how many of their children are likely to be born deaf, let alone how many actually will be. But Bell's optimism led him to a hypothesis that others eventually formulated independently as a basic element in the study of heredity. He suggested that marriage into normal families would tend to submerge or extinguish a hereditary tendency to deafness. In other words, he believed that deafness was what later would be called a recessive rather than a dominant trait.

Bell later financed a more thorough study than his own, one which essentially confirmed his findings. The two studies taken together constitute the soundest and most useful work on human heredity produced in nineteenth-century America. By that token the work may also be counted Bell's most notable contribution to basic science, as distinct from invention.

Meanwhile Bell went on during the 1880s to trace deafness through several generations in certain families, confining his scrutiny to New England as being richest in long-continued genealogical records. As the scope and magnitude of his research grew, he hired assistants and finally a librarian, John Hitz, former Swiss consul in Washington. Transcripts of deeds and vital records, published genealogies and town histories, reports of schools for the deaf, census cards, and other data mounted higher and higher in a room of Bell's Volta Laboratory (so-called because of the Volta Prize Bell had won for his work in electricity). In the late 1880s Bell christened Hitz's office and library the "Volta Bureau," designated Hitz as its "Superintendent," and endowed it with a trust fund. In the 1890s, Bell's father gave $15,000 to help erect a fine new building for it in Georgetown, near Washington, D.C. Helen Keller, aged twelve, turned the first spadeful of sod for what became a neoclassic yellow-brick and sandstone library with stone steps rising high to a portal framed by massive columns. John Hitz went on enlarging the collections and making the bureau a major source of information about deafness and the deaf. By the time of his death in 1908, the Volta Bureau had become one of the world's leading centers of such information; and since its merger with Bell's Association in that year, it has continued to serve the world as the Association's headquarters and library.

But while Bell quite rightly sought to amplify his work for the deaf through institutions, conventions, and schools, he never lost touch with the deaf as individuals. Direct appeals for help and advice kept coming to Bell from people like the Pennsylvania lawyer who had been growing very deaf for several years, and who wrote, "I am yet a young man and a long life of silence and poverty makes me draw a long breath when I think of it." The slow, inexorable closing in of silence, the noiseless decay of lifelong hopes, pervaded these plain tales like a nightmare. And Bell reached out his hand.

In the earlier years of his fame, Bell sometimes got inquiries about the possibility of his inventing an electrical hearing aid. But knowing his limits as an inventor, he could only expose fraudulent gadgets and give advice as to speechreading courses. As his campaigns for articulation and speechreading became better known, the appeals usually dealt with those subjects in the first place. After Mabel's influential paper on speechreading was published in 1895, he often enclosed a copy of it with his reply.

In the letters of adults about whom deafness had begun to close, there was the terror of those who knew what they were losing. In letters from parents of deaf children, there was the eagerness of those who had come to terms with despair and now suddenly heard a whisper of hope. Bell did his

best to steer between deadening caution and false optimism. He stressed the importance of speech training at an early age, if possible as early as that at which hearing children began learning to speak. He must have welcomed letters from deaf children themselves, for he preserved a special file of them. "His dominating passion is his love for children," Helen Keller once wrote of him. "He is never quite so happy as when he has a little deaf child in his arms."

Helen Keller herself was the most famous of those children. At the age of nineteen months she had been made permanently and completely blind and deaf by illness. Early in 1887, when she was six years old, her father brought her to Bell in Washington. Helen was a healthy child, excited to something like happiness by what she felt of the novel journey. Yet in her well-shaped face, for all its intimations of dormant intelligence, there seemed to be an indefinable, chilling emptiness. Something in Bell's touch, Helen remembered years later, gave her an impression of tenderness and sympathy. She sat on his knee and felt his watch strike. He understood her rudimentary signs, and she knew it and loved him at once. "But I did not dream," she wrote in later years, "that that interview would be the door through which I should pass from darkness into light."

More than ten years before, Bell had talked by means of finger spelling with Laura Bridgman, the deaf-blind girl who had been taught by Samuel Gridley Howe at the Perkins Institution in Boston. Bell had kept up with the work of Howe's successor at Perkins ever since. And so he encouraged Helen's father to write the Institution. Keller did so and thereby initiated the astonishing life work of Annie Sullivan.

Herself a partially blind graduate of the Perkins Institution, Annie was twenty when she arrived at the Kellers' home in Alabama to begin one of the world's most famous triumphs in teaching. That day, March 3, 1887, was to be cherished by Helen Keller as her "soul's birthday." It also happened to be the fortieth birthday of Alexander Graham Bell. On April 5 came Helen's breakthrough to the understanding that things had names, and three months later she was writing letters. "Dear Mr. Bell," said one of them, "I do love you." Bell himself helped spread the news of what was being achieved. He saw a wider good coming from the dazzling emergence of Helen's mind. Through her, he wrote, the public "may perhaps be led to take an interest in the more general subject of the Education of the Deaf."

In one respect, Bell stood alone among Helen Keller's admirers. He insisted that what had occurred was not a miracle but a brilliantly successful experiment. From what Annie Sullivan reported to him, he found the key in her constant spelling of natural, idiomatic English into Helen's hand without stopping to explain unfamiliar words and constructions, and in her encouragement of Helen's reading book after book in Braille or raised type, with a similar reliance on context to explain new language. This, he pointed out, was how a hearing child learned English. And it supported his long-standing emphasis on the use of the English language with deaf children, including the use of books.

Helen's example and inspiration did hearten teachers of the deaf when she came to summer meetings of the Association. In 1896 Helen herself addressed it. "If you knew all the joy I feel in being able to speak to you today," she said, "I think you would have some idea of the value of speech to the deaf . . . One can never consent to creep when one feels an impulse to soar." To the public, Helen's most conspicuous handicap was her blindness; and so, though she herself thought deafness the heavier cross, she found herself working more and more for the welfare of the blind. To that extent, her path in life diverged from that of Bell. Nevertheless, her friendship with Bell continued warm to the day of his death, thirty-five years after their first meeting. More than once, things went

wrong for Helen, and Bell was there with a helping hand. When he was seventy-one, she wrote him, "You have always shown a father's joy in my successes and a father's tenderness when things have not gone right." And her famous autobiography, *The Story of My Life*, began with the words: "TO ALEXANDER GRAHAM BELL, Who has taught the deaf to speak and enabled the listening ear to hear speech from the Atlantic to the Rockies, I Dedicate this Story of My Life."

As public figures, Helen Keller and Alexander Graham Bell each knew in a general way what the other was doing. Helen followed Bell's twenty-year quest for the secret of heavier-than-air flight and rejoiced with him when his efforts and those of the team of young men he had brought together produced the first airplane to fly in the British Empire. Bell spent years hard at work on still other projects that were less widely reported. Persistently, though unsuccessfully, he tried to develop a breed of sheep that would bear two or more lambs at once and thus double production of mutton and wool. He invented and patented the first system of space frame architecture. In his sixties he became absorbed in the design and testing of hydrofoil boats, at last in 1919 setting a world's speed record of seventy-one miles per hour that endured for ten years. He helped build up the National Geographic Society and its magazine, and with his wife he was prominent in the introduction of the Montessori Method into American education.

But even when age and illness began to come upon him, Bell found time to carry on his work for the deaf. Along with his activity in the affairs of his Association, its journal the *Volta Review*, and its Volta Bureau, he became more and more active in behalf of the Clarke School, which had played so crucial a part in the unfolding of his destiny many years before. For more than twenty years after his first visit to the school, his manifold preoccupations had made his visits infrequent. But after his election to the board in 1898 and especially after the dedication of Hubbard Hall in memory of Gardiner Hubbard, he was seen more and more often at the school. In 1917, despite failing health, he dutifully accepted the presidency of the board and thereafter stopped off for a day or two whenever he traveled between his Washington home and his Nova Scotia retreat. In his last months of life, he gave two lectures at Clarke on Visible Speech and carried on an extensive correspondence with educators, scientists, and others about establishing a department for research on the problems of hearing loss. He would have been proud, but I think not surprised, to see how well the Clarke School has furthered his hopes and lived up to his standard in the half-century since his death.

Death came peacefully to Bell at his Nova Scotia home one mid-summer night in 1922. Among the tributes paid his memory throughout the world, few were more apt than that of his friendly rival in invention, Thomas Edison, himself hard of hearing, when as a member of the council of Bell's Association he spoke of "my late friend, Alexander Graham Bell, whose world-famed invention annihilated time and space, and brought the human family in closer touch." Perhaps in Edison's own mind, Bell's work for the deaf was implicitly recognized also in that remark. Bell himself would have wanted it made explicit. Only half a dozen years before his death, he had looked back over his amazing life and had written that "recognition of my work for and interest in the education of the deaf has always been more pleasing to me than even recognition of my work with the telephone." This series of lectures and, still more, the great work of the Clarke School now and hereafter, will help to honor that wish.